

**WIRELESS COMMUNITIES GEORGIA  
TECHNOLOGY WORKSHOP  
GEORGIA TECHNOLOGY AUTHORITY  
June 5, 2006 at the Capitol Education Center**

**QUESTIONS & ANSWERS**

Time of the question noted as seen in the Real Player video.

Note – some of the text below has been edited for clarity and correctness.

34:00

**How do you define the indoor coverage? I've heard some people say there's no way that wireless will penetrate multi story buildings in downtown Decatur. Can you give us some more detail there?**

**ANSWER** (Bailey White) The way we think about indoor coverage is around perimeter rooms with exterior walls. If you look at the application and the application guidance there is an area there under Section 3, and what we talk about there is that for indoors we say a residence or business is covered if at least one room on the 1st or 2<sup>nd</sup> floor can act as the wireless network. 90% of residences and businesses in the coverage area must meet this requirement. There are devices that you'll see a lot of the private companies are now using that are called CPE devices – Consumer Premise Equipment - and that equipment will help amplify the signal and repeat it within the house.

35:32

**Will projects that meet the goals of the program with a different ownership model – will those be considered at all?**

**ANSWER** (Rich Calhoun) Yes, they will be considered. We are going to give you some information about what we've learned from the lessons learned standpoint and the application guidance encourages some form of public / private partnership. We are definitely going to be open to options within that framework as well as additional types of business models.

(Hannah Heck) One thing I would like to clarify – with the 25% match because I presume that for many of you if you haven't already thought of it you are thinking about it now about how it would work for your community. Ideally we look at this 25% as what we've set for the minimum but we are going to be looking for applications offering a higher percentage. We're also looking for that contribution to come from multiple sources, and maybe that if you are a city you look to your county and say "Hey County, How can you utilize this wireless network in our city"? Maybe they would come to the table and in addition maybe you could leverage partnerships with your Chamber of Commerce, large businesses in your town or maybe even your utility companies to leverage in time donations of light poles and so forth. There is an opportunity here to

really leverage some of those partnerships and that's one of the things you will probably get to later that we will be looking for as well.

37:31:08

**How far down in the network will the WCG funds be available - there probably should be a point of interface where the WCG funds will end and where the local funds will begin?**

**ANSWER** (Bailey White) I think this program is fairly open and it has some high level objectives and intents. It's looking for the best way to meet those objectives, so I don't think it's going to presuppose where exactly any cut-off points are.

58:05:03

**The requirement for the 2.4 GHz for public safety – that's not a licensed frequency as I understand it. We were looking at using 4.9 because it is licensed and secure. The 2.4 is not a secure frequency – will we be able to go forward with the project using the 4.9?**

**ANSWER** (Bailey White) The intention for WCG is not to say you can't use 4.9 or anything like that. WCG does not fund 4.9 though. For emergency services, all the Guidance says is in terms of prioritization of network traffic. The network should be able to prioritize for emergency services traffic that runs on 2.4. There is not any requirement that you deploy emergency services on 2.4. It just has to be available.

(Hannah Heck) Our intent in adding that specific provision is that some cities have deployed wireless networks that have been specific to a government function particularly public safety, and I will tell you that in general that was not our main vision for this program. We are really looking to see wireless networks that hit at it at a greater sphere of their respective governments and overall community, and I think one of the things given with all of this is that we understand that there are different time lines – there may be a wireless network that starts off hitting at a certain population and then opens up to different users with different time lines for different users.

59:32:03

**Your comment on #1 under requirements in Section 3.0 – network will be available to customers of all types including residential and business customers. Can you explain that a little bit deeper?**

**ANSWER** (Rich Calhoun) Yes, the governmental portion with the application is key but you might have business and governmental or you might have residential and governmental or even all three, but you got to have governmental services.

01.00.55

**If the government is doing internet service internally says doing VOIP would a citizen have the right to demand the same service if it's only governmental use?**

**ANSWER** (Bailey White) Say you deploy voice over IP within the governmental agency you are a part of - No, that would not be required at all for residencies.

(Rich Calhoun) I think you are going to have service level agreements across residential, business and governmental. They are all going to have different types of service level agreements. You might decide from an economic standpoint that residential has some level that is equal to the governmental service or application – or you might decide not to have that.

You need to look into the future what your customers might be asking for and make sure you have that capacity and application plan downstream to meet those needs and that will keep people wanting to come into your network

01:03:36

**I have a question about # 6 in the minimum wireless requirements. What if we have already had a case study done where the umbrella was not Wi-Fi, it was a different type of technology but you could include Wi-Fi into that particular canopy?**

**ANSWER** (from Rich Calhoun) Yes, that's ok but are you still going to use Wi-Fi?

**ANSWER** (from Guy Mullis) The majority of what we've seen so far was not Wi-Fi – I can't remember exactly what the technology was but it was not based on the wireless wi-fi cards you put into the PDA or laptops. It was a separate modem type system that comes from the tower and requires a specific modem.

**ANSWER** (Bailey White) I wouldn't say that that would be accessible under this program. The intention here is to hit a very broad percentage of the population and using a proprietary solution makes that a lot harder to accomplish.

01:08:26

**If private ownership is the rule and not the exception and if it is - is there a callback provision for the community in the state's investment?**

**ANSWER** (Bailey White) The question is what does Wireless Communities Georgia expect if the public / private partnership should fail. It is up to the applicant to describe how the private partnership would work - there's not a simple template or document in here that says we expect all these clauses and all these things to be in place with this particular applicant. I also think it is important to know what public private partnership means because it may not be so black and white – there may be questions where you say well maybe we as a public entity need to own a part of the network and maybe another part is owned by a private party - maybe we as a public entity need to play some role in this ongoing basis and the private party plays another role. We think there is a lot of room to structure something that works best for each individual community.

01:10:21

**On number 3 of Section 3.0 wireless network planning – Do I read that correctly to understand that QOS quality of service is disallowed? One service having priority over another type of service – this says that each should have equal access to the network essentially and then you put voice over IP, streaming media and those types of things and certainly video and voice over IP is a quality of service item.**

**ANSWER** (Rich Calhoun) What we are saying is that we just don't want to block certain applications on the network or in any way discriminate against them. That means you have a planning basis for the network capacity for voice over IP or any of those particular applications.

(Bailey White) Quality of service can be a great piece of the network and there is nothing disallowing it. At the same time we don't want to see a situation occur where let's say maybe the partner was a large incumbent telco provider and then they block Vonage or other systems so you have to buy VOIP service through them – that's something we're concerned about - not quality of service.

01:12:46

**Going back to number 2 the open access service provider model – If there's a concern that consumer choice and economic sustainability would actually be in conflict - which one of those would take priority in the project?**

**ANSWER** (Rich Calhoun) I would say economic sustainability

(Hannah Heck) I think that's something with a lot of these requirements and you could probably look throughout here and say wait a minute there's one here that kind of impedes our ability to accomplish these other requirements, and that's one of the things that we'll be evaluating as we look through the application as to how the different requirements are balanced. In an ideal world you would have an economic sustainability network that is open to competition and open to multiple users and if there is a very viable application that does not fully meet one of those requirements that will be weighed and evaluated accordingly.

In answer to your question that would depend partly on the other applications that were received and how they were able to balance those factors as well, ultimately economic sustainability is a good one. We want to look and see that this network is alive in five years and serving as many users as possible. We've set down certain requirements – competitive – open – and accessible by multiple users. But we tried to keep it open enough that local entities could come forward with their own innovations.

01:22:13

**We are interested in whether or not a consortium (municipalities, educational outlets, private vendors all working together so there's not so much risk if say a private vendor relationship were to go south) management model might work better than a private vendor being in control of infrastructure?**

**ANSWER** (Rich Calhoun) I think that is a good model - a great approach to have the consortium to include educational, different counties - I think that would be a pretty good strength.

01:24:16

**There is a question about the aggressiveness of the time line for submitting of applications and approvals and there seemed to be a thought that this would be somewhat extended – is there something more that you can elaborate on?**

**ANSWER** (Rich Calhoun) We have gotten input from extending the application period. We are discussing now for allowing for an additional 2 weeks possibly at the most.

01:57:01

**Has this (municipal wi-fi) ever worked in a small city?**

**ANSWER** (Bailey White) I actually think this movement came out of small cities. Small cities have the agility necessary and they have the ability to work together in ways that larger cities don't. Athens, Ga. claims to be the first downtown that ever had wireless broadband in the country which came about back in 2002 or the first of 2003 as an experiment with UGA. One recent community is St. Cloud, FL and that is a community of about 28,000 people and they've put in a network across their city so it definitely can happen in small places.

(Rich Calhoun) The barriers to entry into this market from the rural standpoint is that a lot of vendors said they just couldn't make it work financially and those types of things but with the technology maturing and the markets maturing it's a fresh look that's being taken at the rural market and I think from that standpoint we're looking at maybe different business models that are really going to get into that space so I think that the barriers to entry are coming down and I think maybe these types of omissions that we are putting forth here will usher in a new renaissance from the rural standpoint to really make that work and I'm optimistic but I think we have an opportunity to look at the rural areas especially with partnerships that might be established to make sure that model is sustained.

(Bailey White) There is a challenge economically. It is a question of density. We thought about this in the application process and said do we need to have some sort of density number or minimum where we say "We need to have this many people per square mile." And we actually decided that it's up to the community to look at this and figure out how they want to make it work in their community. If you have one person per square mile in your community and you need to put a radio in or several radios in within that area – you are looking at a very expensive deployment just to reach that one person so density does have a key relationship to make the numbers work.

02:08:49

**Would the devices that are necessary to deploy these types of applications be fundable? For example cameras, PDA's, laptops, devices that would go in a squad car like a mobile access router or something like that that would be key to a radio network or a cellular network?**

**ANSWER** (Rich Calhoun) We are going to look at the items you are asking for from a holistic standpoint from the application. If for example things are not in balance or you are asking for 25 PDA units and we don't think that is going to be a good use because it doesn't map to your market assessment, we'll have a concern. But from the most part you guys know what you need and it will stand the test that you need these particular elements but it would be inclusive of all the things you just named. I'm not sure if there is anything – there are some things that could be out of balance but we'll know it when we see it but for the most part if it supports the aim of the program and secondly it makes sense for the deployment of the phase that you are in and we can look at some economic sustainability that supports that - we are going to go with it.

02:10:40

**This is a more general question about the funding. With the deadline in July with a possible 2 week extension that you mentioned, is this a one-time funding or a one year grant? In other words are you going to do this again in the following budget?**

**ANSWER** (Rich Calhoun) This is a one-time shot of 4 million dollars that has been allocated by the legislature - four million and of course the 25% would make it five million total with the municipalities but there is no ongoing support for additional funds at this point. This money is for the program performance period which is August '06 to August '08 and that is the period by which this program will be governed. But there are no additional funds at this point.

**RESPONSE** And do you know how that relates to the One Georgia Program?

**ANSWER** (Rich Calhoun) The One Georgia Program is a little bit different; I'm going to refer you to the website but I understand they have rolling enrollments over time because they include loans and what have you. So that program has a different funding stream with other funds that they might have so I would refer you to the One Georgia website.

02:20:54

**In our county we have some viable companies that offer broadband capability. How's that met with the established businesses in the community? I can see in our community it being an issue that we are setting up competition for folks we already have established in our community.**

**ANSWER** (Bailey White) At the beginning that was a big issue. Philadelphia is one of those – Verizon and Comcast were fighting it out, saying, "Absolutely not. You're taking tax dollars and competing with us – completely unfair." Now I think we've moved past that. The business models have changed to emphasize public / private partnerships.

Now people are looking at how do we work together? Wireless broadband is coming. This is a new means of getting broadband to people.

**RESPONSE** And I understand it as it relates to private residences but especially for example T1 and T1 replacements there's a fair amount of cost that the county would receive or that the city would receive by replacing those. For these to be viable entities you would have to look at offering T1 replacement to companies that are already in place and that is dipping into Bell South's back pocket and saying that now we can replace this for x amount of money – they are a fairly strong lobby – not just locally but on the state level too.

**ANSWER** (Bailey White) The ideal is it is competition and it's done with private partners; it's not something where the city is doing something on its own. This program is about public private partnership.

(Rich Calhoun) I think that the competitive nature of what happens on the local level might introduce some technologies that might be stopped or somehow replaced but I think the market forces will decide that as things move forward. These are some possibilities that might happen. If Wi-Fi continues to evolve with its standards and the equipment gets better and the handsets and the PDA's and that kind of stuff could be revolutionary but that's just something that everyone has to deal with on the local level. I remember years ago when ISDN came in and everybody - at the time I was working with AT&T – they thought it would revolutionary. I worked on the 5 ESS switching system – we just couldn't get that economic model to work for ISDN so AT&T Bell Laboratories became the biggest provider itself for the company of ISDN until they could work out some of the costs elements of it. I think that every one of these technologies will go and meet against an established technology and I hope and think that the consumer will be the benefit of this competition that happens from that standpoint.

02:27:27

**In the business model that you have upon the screen now if this was a funded proposal who would own title to the equipment purchased with this grant – would the network owner hold title or would the city hold title?**

**ANSWER** (Bailey White) I think that the network owner would hold title to that. To be clear, WCG is not providing a grant it's a funding transfer directly from GTA to your local entity. It would probably be that the city would purchase services rather than buy equipment.

02:28:17

**On that question I'm a little confused. The funds that the provider gets can pull back out over the years in user fees?**

**ANSWER** (Bailey White) That's right. The funds that you might receive through Wireless Communities Georgia could include fees for services

02:37:34

**Has there been any work with Georgia Power starting the process of negotiation around pole attachment and meter versus per radio discussion?**

**ANSWER** (Bailey White) As a matter of fact I was speaking with Decatur at the break and there have been a couple of cities that have starting talking about this with Georgia Power. There has not been any communication from GTA or the Wireless Communication Georgia program at this time. It is something they are working through and we recognize that this will be something that you will not necessarily be able to solve in the application process – it is going to take a little bit of time

02:38:41

**You had referenced the city of New Haven on here and if this is data from that – 22 square miles coverage – was that a mesh deployment? And can you tell us what the cost per square mile was in equipment cost to deploy that to give us an idea to see if this would be feasible for a city that has 10 square miles or 22 or 50?**

**ANSWER** (Bailey White) Yes, it is a mesh deployment. The New Haven network is not live – it's in the RFP process. The cost per square mile is a really interesting one – the cost per square mile can vary dramatically. From industry figures we've seen that cost vary on the capital side from as low as \$50,000.00 per square mile and up to as high as, and this was a very extreme situation, up to \$300,000.00 per square mile. It certainly depends on the coverage you want to do, the topography and everything else within the service level you want to offer. I think originally communities often did projects where the Wi-Fi access was fairly thin – this made a lot of coverage but it was hard to get a signal and I question to some degree how valuable that really is. If you can't rely on a signal can you really count on that service? What we are seeing now as the trend is to have more and more radios per square mile. Originally it seemed like people thought 18 to 20 was a good number per square mile and now we are seeing more like 30 per square mile

02:41:21

**Are there any limitations on the types of services that can be legally offered if this network is indeed owned by a government entity – I'm considering PSC regulations and those types of things. Explaining PSC regulations – In the state of Georgia there are some unique regulations for municipalities that offer telecommunication services and under certain circumstances they have to have CLEC certificates.**

**ANSWER** (Bailey White) Broadband is not a telecommunications service – it's a information service.

**RESPONSE** Not in Georgia – The reason I asked that question is that - what triggered this was when you said T1 replacement - if you are providing a service for a non-government entity – say you are providing commercial services for a commercial entity that is replacing a T1 and it is a point to point service. In Georgia the PSC has ruled that

is a CLEC service. Anything that connects to the internet or for internal governmental use is not regulated.

**ANSWER** We will do some research and post it on the web site. Communities are encouraged to speak with their legal counsel on any specific concerns.

02:47:33

**This is in reference to the timeline with July 7<sup>th</sup> being the current deadline and maybe being extended by two weeks - I mean if you look at the technology and that kind of stuff especially from Lowndes county / Valdosta standpoint that doesn't frighten or overly challenge us. But that partnership that you are talking about - putting that together in the time frame that you propose becomes very difficult and I don't know how much some of these guys have dealt with as far as contracts and vendors such as Motorola or software vendor - you get a corporate attorney involved with a county attorney and you know the end of the world comes before it gets over. How tightly do you tie that to these proposals? Say that we propose a partnership that we're in negotiations on to meet your deadline and that negotiation is still going on – we submit it and you say yes, here is your grant you are awarded and then the partnership falls through because of contractual issues.**

**ANSWER** (Bailey White) This is a topic that we are aware of and we thought about this quite a bit. Some communities may be far along and ready and some may be just starting. In the application, we wanted to get it all out there and to make sure you are educated about the steps involved, however we don't want you to go through and feel such a urgency to put this together right now that you make some decisions that you don't have the time to put into them like you would want.

In a situation like you're in, I'd recommend you say here are the steps we want to go through and we don't know who the private partner would be right now but we're going to work through these steps.

(Rich Calhoun) In the orals we would probably ask the question as to what the likelihood would be for any legal issues or any pricing issues would get resolved and we would get some kind of confidence back that that could happen within a certain time frame but like anything else it's a part of the risk assessment that we would be evaluating from going forward from that standpoint.

02:50:41

**I have another high level question about the spectrum itself. 802.11 is currently an unlicensed spectrum is that right so there's no oversight by FCC or any other authority?**

**ANSWER** (Bailey White) There is oversight in terms of making sure that every device created is compliant with the policies they set forth but there is no management of which devices are utilized in a particular area.

**RESPONSE** And is that true with 802.16 also?

**ANSWER** (Bailey White) 802.16 can run in different frequencies and it depends on the particular frequency licensed or unlicensed – in a licensed situation you get a situation where you say ok this will be the only device operating in this locale

**RESPONSE** Is that why the mesh networks have really taken off first?

**ANSWER** (Bailey White) Yes, the unlicensed component has made this something that people can do quickly and in a cost efficient manner. Licensed networks have traditionally been very expensive. Look at how much cellular carriers have paid for spectrum and the fact that very often now one big cellular carrier will actually acquire smaller carriers just for their spectrum assets.

**RESPONSE** So you don't see any change in that regulation or the government saying "Hey we've decided we now want to put this out for auction or for bid spectrum"?

**ANSWER** (Bailey White) I don't see the Wi-Fi spectrum moving that way – no – I think there will be lots of challenges with spectrum in general but I don't see the 2.4 spectrum policies changing.

02:53:22

**On the question about the government licensing it, do you see any potential for any interference issues or is this going to be an open access network?**

**ANSWER** (Bailey White) Interference can be an issue. It's pretty interesting the way companies have been able to manage that issue - the number of engineers working on that is tremendous and I think you can see that even in the home user when you try an older access point versus something that is pretty new now – you're rarely if ever dropped – it does get managed fairly well but it is something that can be a issue.

03:02:19

**If you had a vendor to come in to take care of your 25% match would that be acceptable?**

**ANSWER** (Rich Calhoun) Under the program it would be acceptable. The one thing that we would be interested in knowing if there is a default from that vendor to carry out those obligations, how do you link them from an MOU standpoint?

**RESPONSE** But if the vendor wants to come in and provide that match that is acceptable or if the vendor wants to come in and provide even more substantial influx of money they can do that as well?

**ANSWER** Yes.

03:03:57

**Milledgeville has a question. If you have funds that are coming from other grants that you are going to use to put toward that 25% match but those grants have already been awarded to some other program, is that a valid match?**

**ANSWER** (Rich Calhoun) No that is not a valid match. We don't want to be linked down the road to resource funding where we have less and less control and you as a municipality or governmental entity might even have less control of it. When we look to sign the MOU and bind GTA to you we want to make sure that we have the certain level of commitment and resources so that our arrangement is 1 to 1 as opposed to a variety of grants or other financial instruments so that is the situation we would like to have.

**RESPONSE** If a foundation wanted to come in and commit funds to Milledgeville to be the match for this program and gave a grant agreement that said those monies would be available – you would not accept that?

**ANSWER** (Rich Calhoun) No, we would accept that. What we would do is this – We would be looking to Milledgeville to tell us that they commit to the 25%. The relationship that they have with the other entity for the 25% match – that's up to them.

03:24:28

**Are there any tools or rules of thumb or whatever that agencies can use to do preliminary figures – how many mesh network radios – how many back haul radios– just something I could use in conjunction with my GIS department to try to do some estimates before we actually went out and had final calculations done?**

**ANSWER** (Greg Richardson) Just a quick disclaimer – I wouldn't take any of those kinds of numbers that I might give you to the bank obviously you have your engineering teams, potential consultants and others who might help you but as the first order a estimate if you will , Bailey talked about one figure this morning that's somewhat useful and I will be conservative with these numbers I'll assume we're talking about carrier grade network of this type in a fairly dense area and I think that a conservative estimate at this level would be better. Bailey talked about one this morning which was typical. We look at somewhere in the order of 30-35 nodes per square mile as a general rule but you might see much less than that in certain communities because of terrain and foliage and capacity needs and so on and that is pretty robust mesh networking in most environments. For example the Philadelphia network is spec'd for 30 nodes on an average per square mile noting some areas in Philadelphia may have 15 and other areas may have 50 as a general rule. On what we refer to as the injection of backhaul capacity, a ratio for a very robust network would have something like 1 to 4 or 1 to 3 as a ratio and what that means is for every 4 Wi-Fi nodes or for every 3 Wi-Fi nodes they would have one of these subscriber nodes. Every time a mesh network has a signal that has to hop from radio to radio, an additional latency is injected into the network (bad thing)

By putting more nodes into the network you essentially cut down on the number of hops and therefore latency is lowered. Some prices: a wi-fi mesh radio is about 3 grand a piece, subscriber units about \$400.00 - \$500.00 a piece, base stations really depend on the

vendor a lot but typically in the tens of thousands of dollars and the distribution radios are sold in a pair and they could be \$10,000.00 or \$20,000.00 a pair – they vary a good bit but anything more specific than that would come down to the specifics of the community but those are some general guidelines.

03:27:54

**So taking in all those pieces together an average cost per node would be how much?**

**ANSWER** (Greg Richardson) It's tough to price per node because some of these nodes service multiple other nodes. It's a hierarchy if you will. The problem is that there are certain fixed costs that get amortized in a network like this over either a very small area or a very large area. Example: If you didn't have the facilities for a network operating center you needed a place to manage the network and you needed some cooling system or that type of thing that could be expensive – let's say that it was half a million dollars or so – that half a million dollars in that example would have to spread across the same 2 square miles in one community as spread across 50 square miles in another and that could really throw the numbers off. Another example – We have one city that has 135 square miles (large metro area), the upper end capital cost is estimated at about 28 million dollars. We have another community that is 7 square miles, extremely dense, pretty high capacity network needed, multi-use: public service / public safety and commercial use. That one on a per square mile basis is more than double - that's about \$350,000.00 per square mile. And again you see the impact of having certain fixed costs that either gets spread over a large area or only gets spread over a small area. So what I would suggest here is you do your own lobbying in the community – there's a lot of expertise out there you can rely on in terms of people that have been involved in these initiatives and that may be an option in terms of you putting your proposal together.

03:31:35

**When do they project profitability in Philadelphia in terms of their participation?**

**ANSWER** (Greg Richardson) I can't speak for EarthLink. We represented the City of Philadelphia in negotiating the process to get to the public partnership – I can't speak for their numbers. As a company I think they are profitable today. I think the question relates more to EarthLink's business unit called Municipal Broadband which is the group that has been chartered with building out these networks in cities like Philadelphia. I don't know that EarthLink tracks or discloses for numbers on that. I can answer you in a more generic way. I think that most wireless ISP's I would think would be looking at making money certainly by the second year.

**RESPONSE** Did they not spend the capital money for Philadelphia (EarthLink)?

**ANSWER** (Greg Richardson) The Philadelphia network all of the capital and the ongoing operating costs and all financial risks is bore by EarthLink.

**RESPONSE** And do you know what that outlay was?

**ANSWER** I think they quoted externally numbers in the 25 million dollar initial capital range and I believe about another 10 or 15 million in ongoing costs over what we negotiated was a 10 year agreement with 2 successive 5 year renewals so I believe in that initial 10 year term what they quoted publicly was about 35 million.

03:33:24

**With those two cities that you mentioned do you have an estimated population of each so I can associate population with square mile?**

**ANSWER** Sure, one thing I would say is that usually household density is more useful as a measurement as opposed to population density because at least in terms of residential services, homes subscribe to a broadband service - individuals typically do not. For example we have a broadband connection in my house but my wife does not have a separate one. The first example was about a million and half in population and about 600,000 homes passed and that's actually a useful metric for you to think about as well because one of the metrics used in the industry is - What is the capital cost per subscriber location passed? That is a very useful number to know. If I told you it would cost \$1,000.00 per every home in your community to pass with the new broadband facility that's a useful number to internalize because you think about and say well I'm going to sell a service that I can sell say for \$50.00 a month and it costs me about \$1,000.00 per home passed for all the subscribers - I can calculate very quickly that it's going to take quite a few months to get back my initial capital investment. The Philadelphia numbers are public and passing 600,000 homes @ 25 million - you are looking at about \$40.00 per home passed which is a low number for a new broadband facility. So if I can pass every home in a city for \$40.00 and I can potentially sell the service for \$20.00 a month, I can see a return more quickly.

The other community is a little more difficult because it has quite a number of people who don't live there (tourist destination) but spend an awful lot of time there so I don't think the residential numbers are as important there as what we refer to as the occasional use subscribers which is in your communities where you have a tourism business you have visitors and if you have those numbers you can make some assumptions about what percentage of the people commuting as a business traveler or as a tourist. Some community may subscribe a service for example a day pass just like you would a hotel. We had a case in Philadelphia where some of the local hospitality organizations - the hotel owners approached us early in the process concerned that we were going to put Wi-Fi over the top of their network that they sold for \$10.00 a night which is pretty profitable for a hotel and after those discussions we had a few rounds with them but it actually turned into an opportunity. In their case the scenario for another \$1.00 a night you could check a box at the hotel and by checking that box I would pay an extra \$1.00 and I would get Wi-Fi service anywhere in the city for that same day. So I think there are opportunities there where you can observe a concern and opposition by some of the folks in your business community and kind of flip that around and say that maybe that is really an opportunity for them to up sale their existing business by using new infrastructure.

03:37:12

**What's the biggest challenge not anticipated by the municipalities in a program like Wi-Fi program something they just went off on and said "My goodness, we didn't anticipate this".**

**ANSWER** (Greg Richardson) That's a good question. Probably a very unlikely answer. I would say it was what was referenced this morning – communication planning. It's just not the opposition it's also on the proactive side – on the positive side – getting the community behind the initiative and having the people in the community even know it's going on. San Francisco has really struggled on the communications planning – They have a lot of people in the community that have expressed concerns – there has been some opposition from incumbents and it's a hot bed of special interest if you will, so in your communities I would suggest the communication planning is going to be important and keeping control and managing the message – why are you doing this? – and reinforcing that message.

03:38:44

**In most businesses as you look at infrastructure costs, they don't have steady inclines, they have plateaus that they go up. Does this business have plateaus levels and the reason I ask it is that we're looking in areas to provide the service – do we just provide it just in the downtown area – do we do it city-wide or county-wide, etc.?**

**ANSWER** (Greg Richardson) What we typically see in these business plans is there is what is referred to as an uptake rate so the service gets launched and becomes commercially available and you are right you hope you see a fairly steep increase in subscribers. That typically will plateau in about a year to 18 months maybe 2 years because you've reached the number of subscribers in the market that the service was intended to reach and you potentially depending on what your existing broadband penetration is in your market you could reach a point where it's saturated and the only way to grow subscriber uptake is to take subscribers away from another service so that's a question. I would again encourage you in places where you have DSL, and you have cable and you have these other potential alternatives you do have to think about that in your business planning and say – What's my penetration rate today in the community? Do I think people are really going to switch from some other services? What is the cost & difficulty of people doing that?

03:40:48

**What's the most common way and what do you think is the best way for securing these networks – RADIUS or certificates – because you just can't blast out a Wi-Fi signal and then be profitable if it's access isn't controlled?**

**ANSWER** There are some that are referred to as best practices. EarthLink has actually been complimented quite a bit on their approach. One of the experts in the industry who follows this pretty closely has suggested that EarthLink's approach to metro scale Wi-Fi insurance security is kind of the gold standard. What their approach has been has been

radius based authentication with 802.1x with EAP authentication types. They essentially can proxy those requests through to other providers you know there is a wholesale/retail split, so if I'm a retail provider in this open access model I need to authenticate my own retail subscribers but I need to have a network owner pass me through the radius request and that's typically done on the basis of Virtual LANs so that basically means that it's one physical network that's deployed throughout the community one physical network like we talked about but it looks logically like multiple networks. What VLANs do is essentially allow different security profiles personalities to be set up – they authenticate differently – some are open – some are not – the method of inscription may differ – so there are a lot of flexible approaches. The more secure you get, the more challenge you create in terms of devices having to do something in order to connect to the network in terms of downloading software or installing specialized software.

03:55:54

**You've been mentioning cities and I'm actually from a county and from financial prospective was wondering about the umbrella of an authority as a financing mechanism which would serve the cities and the county if it were – well we have one in place for other purposes - would that be in as much as I know there's a collateralization issue most likely. Authority might be a way to implement this and get around some of the sticky issues.**

**ANSWER** (Bailey White) We did not want to say that only a city government or only a county government can be eligible. Instead, the program says all local government authorities are eligible.

04:02:17

**I'm just curious to know what Civitium's role is going to continue to be through the application process.**

**ANSWER** (Bailey White) We're working on that and we've come up with a couple of ideals on how to help the communities that win like seeing another set of workshops and in general would love to help people progress through the whole series. We've had some great experience on negotiations making sure you get the right deals with your private partners. We're talking about that and we'll figure things out.

(Rich Calhoun) Right now we know that when we do the rewards, we are going to need some formal verification process which would require subject matter experts in the network phase and the network services phase. And really just trying to keep the lessons learned because lessons learned is traveling really fast to from the business side so we are going to need that support. We are in the process of looking at what that next phase needs from a GTA standpoint and we'll probably make some determinations going forward.